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he is inclined to side with Börgesen. The Faeroes certainly have a flora of recent origin, thus contrasting with the Azores and Canaries, where endemism is to be found. While Warming accepts Ostenfeld's strictures in the matter of seed dispersal by birds and ocean currents, he thinks that wind is an adequate transporting factor. The fauna and geological considerations seem to unite against the land-bridge theory. Warming says that he is more inclined now than ever before to believe in the efficiency of wind as an agent for scattering seeds over great distances. A third and final part of this valuable work is promised for the near future.— H. C. COWLES.

Two text-books on agriculture.

AGRICULTURE FOR BEGINNERS, by Burkett, Stevens, and Hill[2] forms a small but very attractive volume, designed as a text-book in agriculture for the public schools. The subject-matter of the book is divided into nine chapters, each dealing with a subdivision of agriculture or related sciences, as: soil, diseases of plants, domestic animals, etc. If, as the authors believe, "agriculture is an eminently teachable subject" and should be taught in public schools, this book forms an excellent introduction to the subject. It is written in clear style and is remarkably free from errors which usually find their way into works dealing with such heterogeneous subjects as the so-called science of agriculture. Moreover, the excellent typography and numerous artistic illustrations make the little book unusually attractive. In a few cases it would seem that subjects are not treated in just proportion to their relative importance. Thus, the discussion of drainage of the soil is limited almost to bare statements of the effects of draining, without sufficient explanation to make them clear. On the other hand, two whole chapters are devoted to descriptions of specific fungous diseases and insect enemies, although these are hardly germane to the subject. The authors inform us that the chapter on dairying, in which accidentally were included several miscellaneous sections, has been properly rearranged in later impressions.

The other volume, entitled *Agriculture for the common schools*,[3] comes from the pen of James B. Hunnicutt. While this book contains an abundance of wholesome ethical advice and perhaps some good practical hints for the farmer, its absolute lack of scientific accuracy should preclude its use in the schoolroom. Aside from the general ignorance of natural phenomena displayed throughout the book, such flagrant errors as the following are common: "Each of these [roots] carries a little soft point called spongiole on the tip, and through this constantly absorbs or drinks in the water from the earth." "Some of these elements, such as carbon dioxid and hydrogen, were formerly thought to be absorbed or taken into the plant through the leaves. . . . . It is now thought that even the air must furnish its food to plants through the roots."—H. HASSELBRING.

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[2] BURKETT, C. W., STEVENS, F. L., and HILL, D. H., Agriculture for beginners. pp. i + 267. *figs. 215.* Boston: Ginn & Co. 1903. $0.85.

[3] HUNNICUTT, J. B., Agriculture for the common schools. pp. viii + 225. Atlanta: The Cultivator Publishing Co. 1903.

Biology of plants.

ONE OF THE first to appreciate the modern ecological view-point was Professor Wiesner, who issued his classical *Biologie der Pflanzen* in 1889. A second edition of this work has appeared[4] in which no radical change of treatment is to be seen. Throughout the new edition, however, the contributions of the past decade are found intercalated in their proper places. In the introduction there is a fuller setting forth of vitalism and mechanism. Among the topics which are added or much changed are polarity, light and rain adaptations, photometry (the author's own work). The chapter on evolution is also much changed, and the last part is largely new. The order of the chapters is as follows: SECTION I, Biology of the vegetative processes: the individual; survey of the plant forms according to their mode of life (biological types); primordia, development, form and direction of organs; polarity, correlations, and leaf position; complications in determining the causes of organic forms; rhythm of the vegetative processes; germination of seeds and buds; vegetative growth; flowering and fruiting; rest periods and leaf-fall; adaptation of plants to external vegetative conditions; adaptation of plants to other organisms; specific adaptations, reproduction; life duration; vitality. SECTION II, Biological relations of reproduction; distribution of sexual organs; wind-pollinated plants; insect pollinated plants; other aids to pollination, and transitions from one form to another; reciprocal pollination; adaptations for self-pollination; protective adaptations of flowers; apogamy. SECTION III, Distribution of plants; fundamental principles and problems; vegetation forms and formations; distribution areas of species, genera and families; principles of systematic phytogeography. SECTION IV, Development of the plant world (theory of descent). APPENDIX: Historical development of botany. Thus one may see how thorough and comprehensive is this admirable treatise on plant biology, or, as we would say, ecology.—H. C. COWLES.

Plant geography.

THE SIXTH volume of the invaluable series, *Vegetation der Erde,* is by Drude himself and embraces much of the material which he has been gathering for years in his own home-land of Saxony.[5] Just as Graebner's work on

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[4] WIESNER, JULIUS, Biologie der Pflanzen, mit einem Anhang: die historische Entwicklung der Botanik. Zweite, vermehrte und verbesserte Auflage. 8vo. pp. viii + 340. *figs. 78* and *1 map.* Vienna: Alfred Hölder. 1902.

[5] DRUDE, O., Der Hercynische Florenbezirk. 8vo. pp. xix + 671. *pls. 5. figs. 16. 1 map.* Leipzig; Wilhelm Engelmann. 1902. *M*30, bound *M*31.50; to subscribers *M*20–21.50.